REMARKS

Applicants are amending claim 1 to recite that the second circuit layer is electrically connected to the other side of the base substrate or to the electrode, whichever remains unconnected "to the first circuit layer", and to recite that the other side of the base substrate and the electrode are connected either to the first circuit layer or the second circuit layer, respectively, via the (anisotropic) conductive adhesive agent. Note, for example, Figs. 1(b) and 2(b) of Applicants' original disclosure, as well as Fig. 3(b) thereof; and note also paragraphs [0025] on page 7, [0029] bridging pages 8 and 9 and [0052]-[0055] on pages 15 and 16, of Applicants' specification, corresponding to the above-mentioned drawing figures, to be illustrative and not limiting.

Initially, Applicants respectfully request reconsideration and withdrawal of the Finality of the Office Action mailed July 19, 2010. Noting previously considered claims 2 and 4, incorporated into claim 1, in the Amendment filed April 29, 2010, and also noting the reference newly applied by the Examiner as the primary reference in the Office Action mailed July 19, 2010, it is respectfully submitted that while making the Office Action mailed July 19, 2010, a Final Office Action, while applying the new reference, is improper. In this regard, the contention by the Examiner on page 8 of the Office Action mailed July 19, 2010, that Applicants' amendments in the Amendment filed April 29, 2010, necessitated the new grounds of rejection, is respectfully traversed. It is respectfully submitted that subject matter of claim 1 in the Office Action mailed July 19, 2010, had previously been considered by the Examiner, in previously considered claims 2 and 4. It is respectfully submitted that by applying the new reference in the Office Action mailed July 19, 2010, in

connection with subject matter previously considered by the Examiner, the subject matter mailed July 19, 2010 could not properly be made a Final Office Action.

In any event, it is respectfully requested that the present amendments be entered, notwithstanding the Finality of the Office Action mailed July 19, 2010. In connection therewith, contentions by the Examiner in the first full paragraph on page 3 of the Office Action mailed July 19, 2010, are noted. It is respectfully submitted that the present amendments to claim 1 address these contentions by the Examiner, and, accordingly, are clearly timely. The present amendments to claim 1 do not raise any issue of new matter; and it is respectfully submitted that in light of previous arguments made in the above-identified application, as can be seen by responsive comments by the Examiner in the first full paragraph on page 3 of the Office Action mailed July 19, 2010, the present amendments do not raise any new issues. Clearly, the present amendments are timely, being in response to contentions by the Examiner in the Office Action mailed July 19, 2010; and it is respectfully submitted that the present amendments materially limit issues remaining in connection with the above-identified application.

In view of the foregoing, it is respectfully submitted that Applicants have made the necessary showing under 37 CFR 1.116(b); and that, accordingly, entry of the present amendments is clearly proper.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed July 19, 2010, that is, the teachings of the U.S. patents to Morizumi, et al., No. 6,459,588, and to Haas, et al., No. 7,015,479, under the provisions of 35 USC 103.

It is respectfully submitted that the teachings of these applied references would have neither disclosed nor would have suggested such an electronic device as in the present claims, having an IC element and first and second circuit layers, wherein the first circuit layer is electrically connected either to a side of the base substrate (provided by the IC element) that does not have any electrode formed thereon or to an electrode provided by such IC element, with the second circuit layer being electrically connected to either this other side of the base substrate or the electrode, whichever remains unconnected to the first circuit layer; and wherein the other side of the base substrate and the electrode are connected either to the first circuit layer or the second circuit layer, respectively, via a conductive adhesive agent or an anisotropic conductive adhesive agent. See claim 1.

By providing the configuration as in claim 1 wherein both the other side of the base substrate and the electrode are connected to respective circuit layers (either to the first circuit layer or the second circuit layer, as defined in claim 1), manufacture of the device is facilitated, while a device having, e.g., good communication properties, can be efficiently produced at low cost.

As will be discussed in more detail infra, in Morizumi, et al., the side of the IC element 12 that does not have the terminal 12a contacts adhesive layer 22 and is not connected to the antenna circuit 13; and, accordingly, it is respectfully submitted that the teachings of Morizumi, et al., even in combination with the teachings of the primary applied reference to Haas, et al., would have neither disclosed nor would have suggested such an electronic device as in the present claims, including, inter alia, wherein the first circuit layer is electrically connected either to the other side of the base substrate or the electrode and the second circuit layer is electrically connected to that same other side of the base substrate or the electrode, whichever

remains unconnected to the first circuit layer, and wherein the other side of the base substrate and the electrode are connected either to the first circuit layer or the second circuit layer, respectively, via a conductive adhesive agent or an anisotropic conductive adhesive agent.

In connection with the prior art rejection, the statement by the Examiner in the first full paragraph on page 3 of the Office Action mailed July 19, 2010, that Haas, et al. is silent "as to that either circuit layers are connected via a conductive adhesive agent or an anisotropic conductive adhesive agent"; and the further statement by the Examiner that he is "reading this limitation in the alternative due to the phrasing 'any of the other side of the base substrate and the electrode'", are noted. As presently amended, claim 1 recites that the other side of the base substrate and the electrode are connected either to the first circuit layer or the second circuit layer, respectively, via a conductive adhesive agent or an anisotropic conductive adhesive agent. Accordingly, it is respectfully submitted that any reading by the Examiner as to connection of the circuit layers "in the alternative" is improper in connection with claim 1 as presently amended. Specifically, it is respectfully submitted that the teachings of the applied references, i.e., Morizumi, et al. and Haas, et al., would have neither disclosed nor would have suggested the electrical connection of the first circuit layer and second circuit layer to the other side of the base substrate or the electrode, as in claim 1, and would have neither disclosed nor would have suggested wherein the other side of the base substrate and the electrode are connected either to the first circuit layer or the second circuit layer, respectively, via the conductive adhesive agent or the anisotropic conductive adhesive agent, as in all of the present claims.

Furthermore, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such an electronic device as in the present claims, having features as discussed previously in connection with claim 1, and, additionally (but not limited to), wherein the conductive adhesive agent is comprised of materials as in claims 3 and 5; and/or wherein the IC element is sealed by a matrix resin of anisotropic conductive adhesive agent as in claims 6 and 10; and/or wherein at least either the first or second circuit layers includes a conductive layer of aluminum or copper (see claims 7 and 11); and/or material of the base substrate on which the first and/or second circuit layer is supported, as in claims 8 and 12; and/or wherein the first and/or second circuit layer is supported on a base substrate comprised of paper, as in claims 9 and 13; and/or wherein at least one of the first and second circuit layers is a transmission and reception antenna (see claims 14 and 15), particularly wherein the first circuit layer includes a slit and operates as such antenna, and the second circuit layer is a bridging plate electrically connecting the IC element and the first circuit layer (see claim 15).

The present invention relates to an electronic device that can be used, for example (and not to be limiting), as a non-contact type individual identification device mounted on an IC element.

In recent years, non-contact type individual identification systems that employ Radio Frequency Identification (RFID) tags have been considered, e.g., for managing the entire life cycle of a product, including production, distribution and sales thereof. Various types of such structures have been proposed, including wherein the IC element thereof has two electrodes for signal input and output formed on the same face. However, various problems exist in connection therewith, in that

the two electrodes on the same face must be positionally aligned very precisely, as described in paragraph [0006] on pages 2 and 3 of Applicants' specification. Such required precision creates a substantial problem affecting mass production.

As described in paragraph [0004], on page 2 of Applicants' specification, it has also been proposed to utilize an IC element in which two electrodes are formed individually on each of the faces of a pair of facing faces of the IC element, forming a sandwich antenna construction.

However, in forming such sandwich antenna construction, each of the electrodes formed individually on each of the faces of the IC element must be extremely precise, and these electrodes have low electric resistance and are usually made of a metal having superior oxidation resistance properties, which mitigates against realizing low costs. Note paragraph [0008] on page 3 of Applicants' specification.

Against this background, Applicants provide an electronic device, which is suitable for mass production, having good communication properties, and which can be efficiently produced at low costs. Applicants have found that where the IC element includes a base substrate formed of silicon, with a semiconductor circuit layer forming a semiconductor circuit on one side of the base substrate and an electrode formed on this semiconductor circuit layer, and with no electrode formed on the other side of the base substrate; and with a first circuit layer being electrically connected to the other side of the base substrate or the electrode and the second circuit layer being electrically connected to that same other side of the base substrate or the electrode, whichever remains unconnected to the first circuit layer, objectives according to the present invention are achieved.

Moreover, the electronic device of the present invention connects the other side of the base substrate of the IC element, that does not have any electrode thereon, to either the first circuit layer or the second circuit layer using conductive adhesive or anisotropic conductive adhesive. Since the presently claimed structure connects both sides of the IC element, either to the first circuit layer or the second circuit layer, via the conductive adhesive or the anisotropic conductive adhesive agent, the connection of both sides of the IC element and the first and second circuit layers can be processed in a single step, thereby reducing production costs. In addition, as the connection can be processed at a low temperature, low-priced components (materials) for the base substrate and the antenna circuit can be used.

Furthermore, since the presently claimed electronic device does not have any electrode on the other side of the IC element, a step of forming electrodes on both sides of the IC element is avoided, thereby simplifying the processing and reducing cost of the electronic device including the IC element.

Haas, et al. discloses photodetector arrays for acquiring images, and in particular a digital film grain that comprises a photodetector that produces an electrical signal having a strength related to an input light flux and a transponder that receives the electrical signal and transmits information quantifying the electrical signal. In one embodiment, this patent discloses a miniature signal sensor with a radio frequency transponder being placed in a capillary or well, along with material enhancing the signal, such as x-ray phosphor. Material between the capillaries or forming the walls of the capillaries reduces or prevent the signal generated in each capillary from generating a response in any other capillary, and this patent discloses that the walls of the capillaries can be reflective for the visible light or for electrons emitted by the phosphor upon absorbing an x-ray in order to reduce loss of signal.

This patent goes on to describe that the sensor may be a photodetector or electron detector fabricated with a radio frequency transponder and an antenna on a silicon chip. Note column 2, lines 10-27. As to specific structure, note Fig. 1 and the description in connection therewith in column 3, lines 26-50.

It is respectfully submitted that Haas, et al. would have neither disclosed nor would have suggested connection of the first circuit layer to either the other side of the base substrate or the electrode, and the second circuit layer to the other of the other side of the base substrate and the electrode, as in the present claims, or wherein the other side of the base substrate and the electrode are connected either to the first circuit layer or the second circuit layer, respectively, via a conductive adhesive agent or an anisotropic conductive adhesive agent, and advantages achieved thereby, as discussed in the foregoing.

Again, it is noted that the Examiner indicates that Haas, et al. is silent as to either circuit layer being connected via a conductive adhesive agent or an anisotropic conductive adhesive agent, the Examiner reading this recitation in the alternative "due to the phrasing 'any of the other side of the base substrate and the electrode'". Such reading is clearly inappropriate with respect to claim 1 as presently amended, reciting that the other side of the base substrate and the electrode are connected either to the first circuit layer or the second circuit layer, respectively, via the conductive adhesive agent or the anisotropic conductive adhesive agent.

It is respectfully submitted that the additional teachings of Morizumi, et al. would not have rectified the deficiencies of Haas, et al., such that the presently claimed invention as a whole would have been obvious to one of ordinary skill in the art.

Morizumi, et al. discloses a noncontact IC card that transfers data in a noncontact fashion to and from an external reader/writer, the noncontact IC card being described most generally in column 1, lines 53-65, and including a card substrate; an IC chip provided on one surface of the card substrate; an antenna circuit provided on the same surface of the card substrate as the IC chip and having a pair of antenna terminals, one antenna terminal being connected to the IC chip; and a connection layer provided on an isolation layer covering a portion of the antenna circuit, and having a pair of end portions, one end portion being connected to the IC chip and the other end portion being connected to the other antenna terminal, with a protective layer provided on top of the card substrate. Note also, for example, Figs. 1 and 2, and the description in connection therewith from column 3, line 35, to column 4, line 50, of Morizumi, et al. This description discloses an IC chip 12, antenna circuit 13, isolation layer 14 and connection layer 15 provided on one surface of the card substrate 11, and a first protective layer 16a and second protective layer 16b provided so as to cover the IC chip, the antenna circuit 13, the isolation layer 14, the connection layer 15 and a capacitor 17, with the IC chip being attached on top of the card substrate 11 with an anisotropic conductive contact film 18 therebetween. Note also column 6, lines 9-17, together with Fig. 2, of Morizumi, et al., showing an IC chip provided on the anisotropic conductive adhesive film 18, with parts of the film 18 sandwiched between the terminals 12a of the IC chip 12 and the antenna terminal 13a and the IC chip connection terminal 13c being compressed, bringing the terminals 12a into contact electrically with the antenna terminals 13a and the IC chip connection terminal 13c, through the conductive particles 18b.

As can be seen from the foregoing, and particularly in Fig. 2, as well as in Fig. 3(f) and the description in connection therewith in column 6, lines 49-57, of Morizumi, et al., it is respectfully submitted that this patent document describes the antenna terminal 13a and IC chip connection terminal 13c connected to terminals 12a of the IC chip on a same side of the IC chip; and provides no disclosure of connection of the other side of the IC chip either to the first circuit layer or the second circuit layer, respectively, via a conductive adhesive or an anisotropic conductive adhesive. It is respectfully submitted that the combined teachings of Haas, et al. and of Morizumi, et al. would have neither disclosed nor would have suggested, and in fact would have taught away from, structure as in the present claims, wherein the other side of the base substrate does not have any electrode formed thereon, and wherein the first circuit layer is electrically connected either to the other side of the base substrate or the electrode and the second circuit layer is electrically connected to that same other side of the base substrate or the electrode, whichever remains unconnected to the first circuit layer, while the other side of the base substrate and the electrode are connected either to the first circuit layer or the second circuit layer, respectively, via a conductive adhesive agent or an anisotropic conductive adhesive agent.

It is respectfully submitted that the combined teachings of Haas, et al. and of Morizumi, et al. would have neither disclosed nor would have suggested the configuration as in the present claims, wherein the other side of the base substrate of the IC element, that does not have any electrode, is also connected, to either the first circuit layer or the second circuit layer not connected to the electrode. Thus, in the case of an IC element having one electrode for input/output terminals on one side of the base substrate, as in the present claims, the other side of the base

substrate of the IC element is utilized for the input/output terminal forming sandwich antenna structure through connecting either to the first circuit layer or the second circuit layer. This means that the other side, while not having any electrode, also needs to be electrically connected. According to the present invention, such electrical connection of the other side is provided using the conductive adhesive or anisotropic conductive adhesive. In the process of binding the IC element using such adhesive, conductive particles in the adhesive break any oxide on the surface of the base substrate made of silicon, thereby providing stable contact resistance. Moreover, since the presently claimed structure connects both sides of the IC element, either to the first circuit layer or the second circuit layer, via the (anisotropic) conductive adhesive, connection of both sides of the IC element and the circuit layers can be achieved in a single step, thereby reducing production costs.

In the paragraph bridging pages 2 and 3 of the Office Action mailed July 19, 2010, the Examiner points to Haas, et al. as describing an electrode formed on a semiconductor circuit layer, and the other side of the base substrate does not have any electrode formed thereon, with the first circuit layer being electrically connected to the electrode. It is emphasized that the present claims recite that the first circuit layer is electrically connected either to the other side of the base substrate or the electrode, and the second circuit layer is electrically connected to that same other side of the base substrate or the electrode, whichever remains unconnected to the first circuit layer, with the other side of the base substrate and the electrode being connected either to the first circuit layer or the second circuit layer, respectively, via the (anisotropic) conductive adhesive agent. The Examiner does not even allege that Haas, et al. discloses connection of the second circuit layer, for example, as in the present claims. It is respectfully submitted that the combined teachings of these

references would have neither disclosed nor would have suggested the electrical connection of the first and second circuit layers, or the connection being via a (anisotropic) conductive adhesive agent, as in the present claims, and advantages thereof.

In view of the foregoing comments and amendments, reconsideration and withdrawal of the Finality of the Office Action mailed July 19, 2010, entry of the present amendments, and reconsideration and allowance of all claims presently pending in the above-identified application, are respectfully requested.

In any event, entry of the present amendments, and reconsideration and allowance of all claims in the application, are respectfully requested.

To the extent necessary, Applicants hereby petition for an extension of time under 37 CFR 1.136. Kindly charge any shortage of fees due in connection with the filing of this paper, including any extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Account No. 01-2135 (case 1204.46479X00), and please credit any overpayments to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By **/William I. Solomon/**
William I. Solomon
Registration No. 28,565

WIS/ksh
1300 N. 17th Street, Suite 1800
Arlington, Virginia 22209
Tel: 703-312-6600
Fax: 703-312-6666